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(54) Improvements in or relating to automobile door locking systems.

(57) An automobile door locking system comprises mechanical means for connecting the door handle to the door latch, said mechanical means comprising separable parts, and electrically operated means for connecting said separable parts together whereby the latch can be released by operation of the door handle and for disconnecting said parts whereupon the latch can no longer be operated by actuation of the handle.

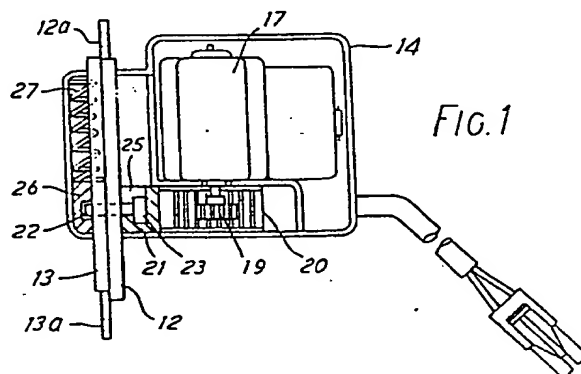


FIG.1

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TITLE: IMPROVEMENTS IN OR RELATING TO AUTOMOBILE DOOR
LOCKING SYSTEMS.

This invention relates to automobile door locking systems especially applicable to systems of the kind in which all doors can be locked simultaneously by a single locking operation.

5 In known systems each door has a latch operated from inside and outside by the door handles, and a locking mechanism which can be operated by the individual press down knobs or by a common switch operating all four locking mechanisms.

10 The main object of the present invention is to provide a simultaneous locking system which is less complicated and occupies less space than presently used systems and which can easily and quickly be mounted on the doors and will provide additional safety to enable
15 occupants to get out of a vehicle involved in an accident.

According to the present invention the system comprising mechanical means for connecting the door handle to the door latch, said mechanical means
20 comprising separable parts, and electrically operated means for connecting said separable parts together whereby the latch can be released by operation of the door handle and for disconnecting said parts whereupon the latch can no longer be operated by actuation of the
25 handle.

In the known central locking systems the central control actuates the door locking mechanisms whereas in the present invention the central control or external control (i.e. the electrically operated means) does not
5 actuate the locking mechanisms but controls connections between the door handles and the door latches.

Therefore if for example a vehicle is involved in a road accident and the driver's lock control becomes inoperable it will still be possible to unlock the
10 other doors and enable the occupants to escape.

The electrically operated means may be in the form (for each door) of a reversible electric motor coupled in a circuit with a capacitor and a resistor, the motor spindle having a pinion driving a rack which actuates a
15 pin engageable in apertures in the separable parts, the four motors being controlled by a common switch.

A key operated cylinder switch resiliently biased to a neutral position may also be provided on the driver's door and on the front passenger's door.

20 The normal press down buttons will be removed from the locking systems and may be replaced by an electro-mechanical indicator to indicate the state of the system, locked or unlocked when the separable parts are connected to or disconnected from each other.

25 In the case of partial or full power failure of the vehicle electrical system or malfunction of any electrical or mechanical part provisions may be made

within the system to either electrically or mechanically override a locked condition such that entry can still be achieved.

The invention will be further described by way of example with reference to the accompanying diagrammatic drawings wherein:-

FIGURE 1 is a sectional view of an electrically operated means for connecting and disconnecting separable parts to be inserted between a door handle 10 and the door latch;

FIGURE 2 is a sectional view thereof on the plane A-A on Figure 3;

FIGURE 3 is a plan view thereof;

FIGURE 4 is a sectional view thereof on the plane 15 B-B on Figure 3;

FIGURE 5 is a circuit diagram of the complete system;

FIGURE 6 is a circuit diagram of a simpler form for the system;

20 FIGURE 7 is a view of the connection between the door handle and the latch;

FIGURE 8 is a sectional view of a door lock operating biased off switch;

FIGURE 9 is an end view thereof.

25 Referring first to Figures 1 to 4 two flat rods 12,13 are arranged slidably one upon the other in a guideway formed in a housing 14. The rod 12 is to be

connected at 12A to the door handle and the rod 13 is to be connected at 13A to the door latch. A printed circuit board 16 is fixed in the housing 14 and a small reversible electric motor 17 is fixed on the board 16 together with a capacitor and resistor, these being connected in series with the motor. A resilient pad 15 is inserted between the housing 14 and board 16. The motor spindle carries a pinion 19 which normally gears with a toothed rack 20 which carries a block 21 that 10 has a T-shaped slot 25. A pin 22 is engageable in holes in the rods 12,13 to hold them together but can be disengaged by actuation of the rack. The pin has a head 23 movable transversely of its axis along the slot 25. The pin is also engageable in a guide 26 which is urged 15 to a position in alignment with the apertures in the rods 12,13 by a spring 27.

Thus when the pin 22 is withdrawn from the holes in the flat rods 12,13 the movements of the handle cannot undo the door latch. When the pin is inserted through 20 the holes in the flat rods 12,13 the door handle is operatively connected with the latch and movement of the rods 12,13 is possible by the sliding of the pin 22 along the guide way 25.

In Figure 5 the four motors are shown at 17A, 17B, 25 17C, 17D and the capacitor-resistor circuit at 18A, 18B, 18C, 18D. The motors and circuits are connected to a dashboard control switch 30 and to switches 35,36 on

the door external key locks. The circuits 18A, 18B are in the driver's door and rear of driver's door respectively and include a fuse 32. The circuits 18C, 18D are in the front passenger's door and rear 5 passenger's door respectively and include a separate fuse 33. The vehicle battery 34 is connected to the motors and switches. The driver's door lock switch 35 and the passenger's door lock switch 36 are connected across one side of the main switch 30. A door pillar 10 switch 37 and an outlock prevention device 38 are connected between the battery and a power failure device 40, the latter including a transistor, diodes and capacitance arranged so that if the battery current fails the transistor-capacitor, upon closing of switch 15 37 (inside the car), will send an impulse to the motor 17A to unlock the driver's door.

Figure 6 is similar to Figure 5 but omits internal control switch 30 for central locking and therefore requires no outlock prevention and omits other parts 20 such as 37,38,40. The switches 35,36 are connected direct to the battery 34.

All the motors are operated in one direction by an impulse derived from discharge of the capacitors and in the other direction by a direct impulse from the 25 battery.

Figure 7 shows one method of applying the invention to an existing door latch. The unlatch lever of the

latch mechanism is shown at 42 and the door locking mechanism at 43. The rods 12,13 are connected respectively to the outer door handle lever 44 to the lever 42. A door keyswitch lever 62 on the driver's door is connected by a rod 62A to a pin 45 engaged in a slot 46 in a sleeve 47 which is attached to the lever 42. The rod 62A is normally connected to the locking mechanism but in the present construction the rod 62A is not so connected but is connected to the pin 45. The rod 62A enables the latch to be opened from outside the door in case of electrical power failure.

Figures 8 and 9 show a door keyhole housing 50 and usual barrel 51 containing the key tumblers. A housing 52 is mounted on the keyhole housing 50. The housing 52 is moulded from a synthetic plastics material so as to be flexible about a position 63 on its circumference so that it can be opened and placed around the housing 50 and can be locked in this position by a catch 58. The housing 52 carries a hollow extension 57 which contains a movable switch contact member 55 and two electrical contacts 60, 61. Springs (not shown) urge the movable member 55 circumferentially to a neutral "off" position. The movable member 55 has a projection 64 which extends through a slot in a steel plate 62 which is keyed to the barrel 51. A spring 67 urges a contact 56 axially towards the contacts 60,61.

The central locking system is made up of the

following parts:-

1. A dashboard mounted, switch operated, control box.
2. An electric motor driven mechanism situated in each vehicle door.
3. Key operated cylinder switches on driver's door and front passenger's door.
4. An electrical wiring loom connecting the control box with the individual door mechanism units and key cylinder switches.

The control box also may contain an electronic assembly which signals the driver's door in event of accident and a subsequent total power failure to an unlocked condition. Also there may be included a shock switch which gives signal to all door mechanisms, that are locked, to unlock, when power is still available in the event of an impact to, or by the vehicle, in excess of six and a quarter G.

The main features of the system of Figure 5 may be summarized as follows:-

1. To lock from inside all outer handles such that they are rendered inoperative. This is achieved via the dashboard mounted switch 30.
2. To lock from outside all outer handles such that are rendered inoperative. This is achieved via either of the key cylinder switches 35,36 mounted on the rear of each door cylinder.

3. Should any unit fail electrically or mechanically in a locked mode the driver's door can still be opened from outside via the key override lever 62A operating directly the latch mechanism.

5

4. Childrens' safety is unaffected as this can be incorporated in the door latch at both rear doors and is a separate mechanical operation.

CLAIMS

1. An automobile door locking system comprising mechanical means for connecting the door handle to the door latch, said mechanical means comprising separable parts , and electrically operated means for connecting
5 said separable parts together whereby the latch can be released by operation of the door handle and for disconnecting said parts whereupon the latch can no longer be operated by actuation of the handle.

2. A system according to claim 1, wherein the
10 electrically operated means is in the form of a reversible electric motor coupled in a circuit with a capacitor and a resistor, the motor spindle having a pinion driving a rack which carries said means in the form of a pin to move it into and out of holes in said
15 separable members , said pin being resiliently movable transversely to the direction of movement of the rack.

3. A system according to claim 2, comprising a housing containing the motor rack and pin, said separable parts being in the form of two flat rods
20 lying upon each other and extending out of the housing and being slidable therein transversely to the axis of said pin.

4. A system according claims 1 or 2, having four said mechanical means, one for each door and two
25 switches connected in an electrical circuit with said

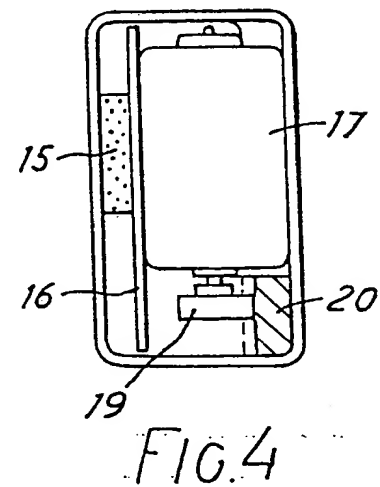
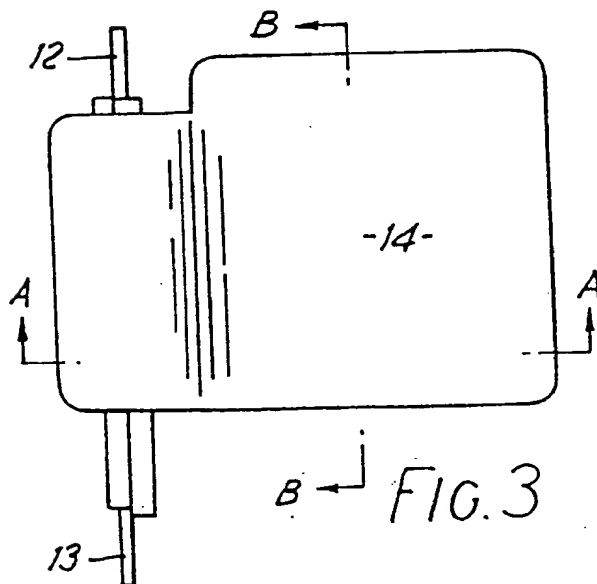
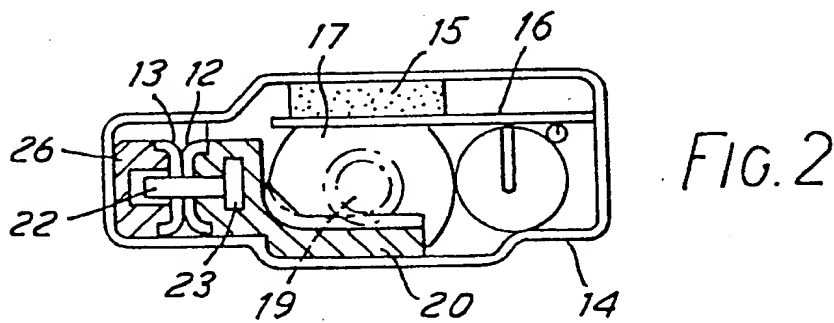
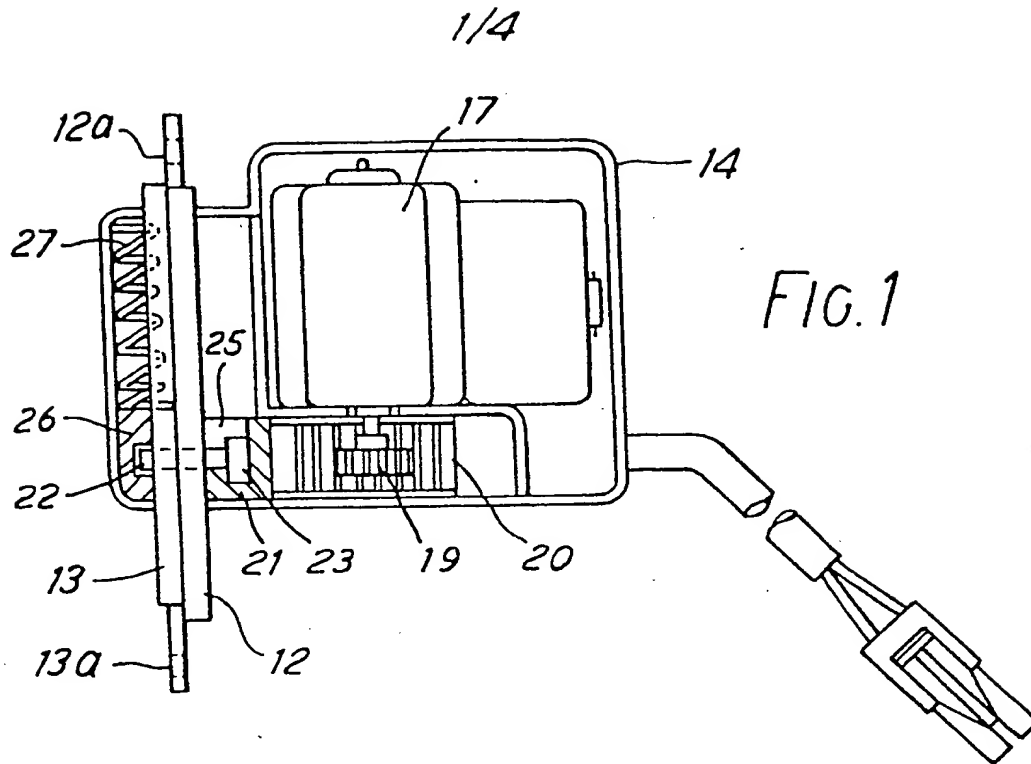
electrical means and arranged for connection to a motor-car battery, each switch serving to effect operation of all four electrical means; said switches having a movable contact having a position in which it
5 is resiliently held in an off position and engageable with either of two other contacts for locking and unlocking the door locks, and means for mounting said switches operating on four door locks.

5. A system according to claim 4, having a further
10 switch connected with an outlock device including a transistor and diodes connected in the circuit such that on closing the switch after failure of electric current an impulse is sent to the motor to unlock the driver's door.

15 6. A system according to claim 4, wherein each said two switches is connected to the motors via a capacitor in parallel with a resistor such that when in use the motors are operable in one direction by electrical impulse from an electrical source and in
20 the other direction by impulse from discharge of the capacitors.

7. A system according to claim 1, having a key switch lever attachable to the barrel of a door lock, a door locking lever, a door unlocking lever and a
25 rod connecting the key switch lever by a lost motion device to the unlatch lever whereby the door lock can be unlocked from outside the door in case of electrical

power failure.



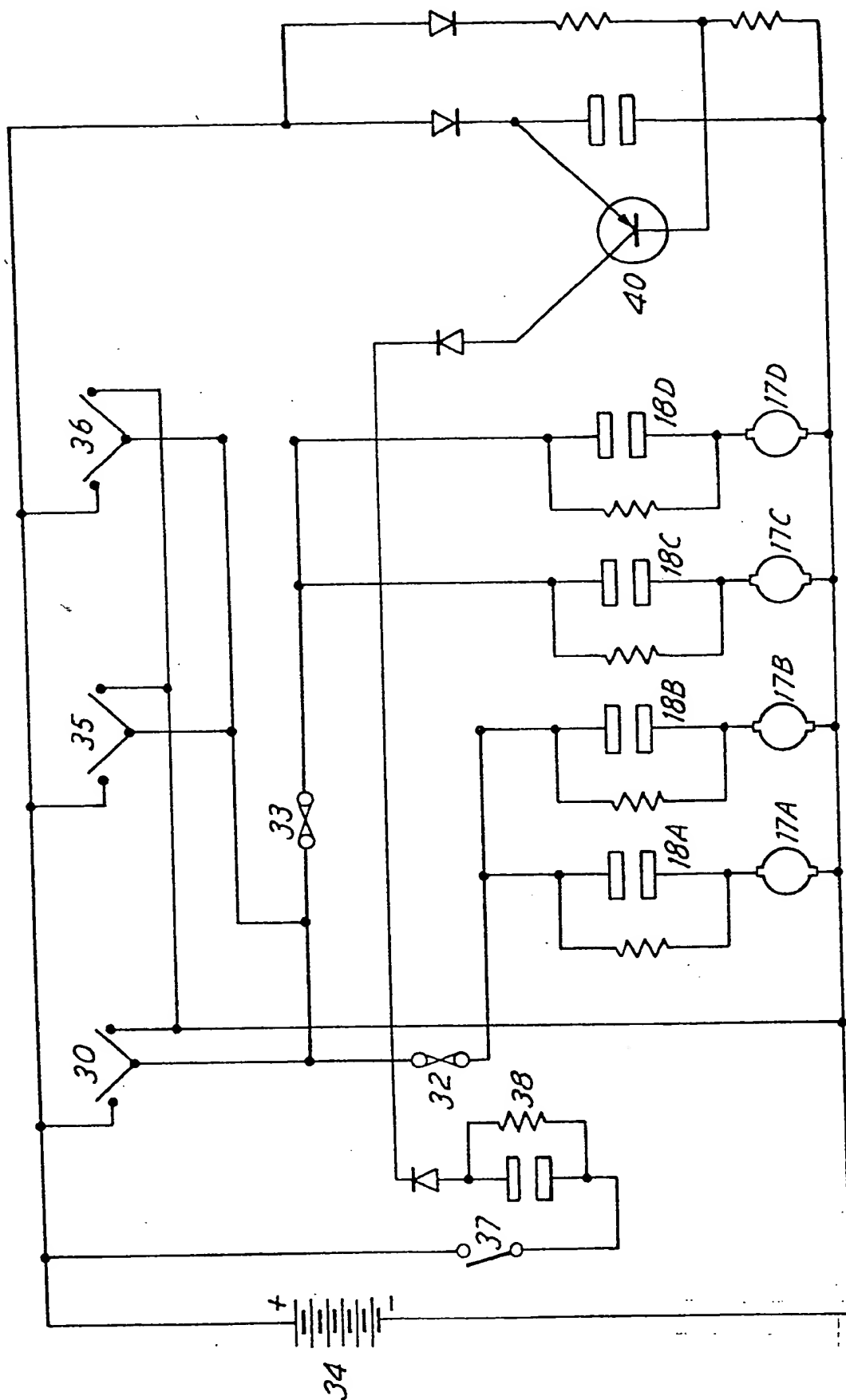


FIG. 5

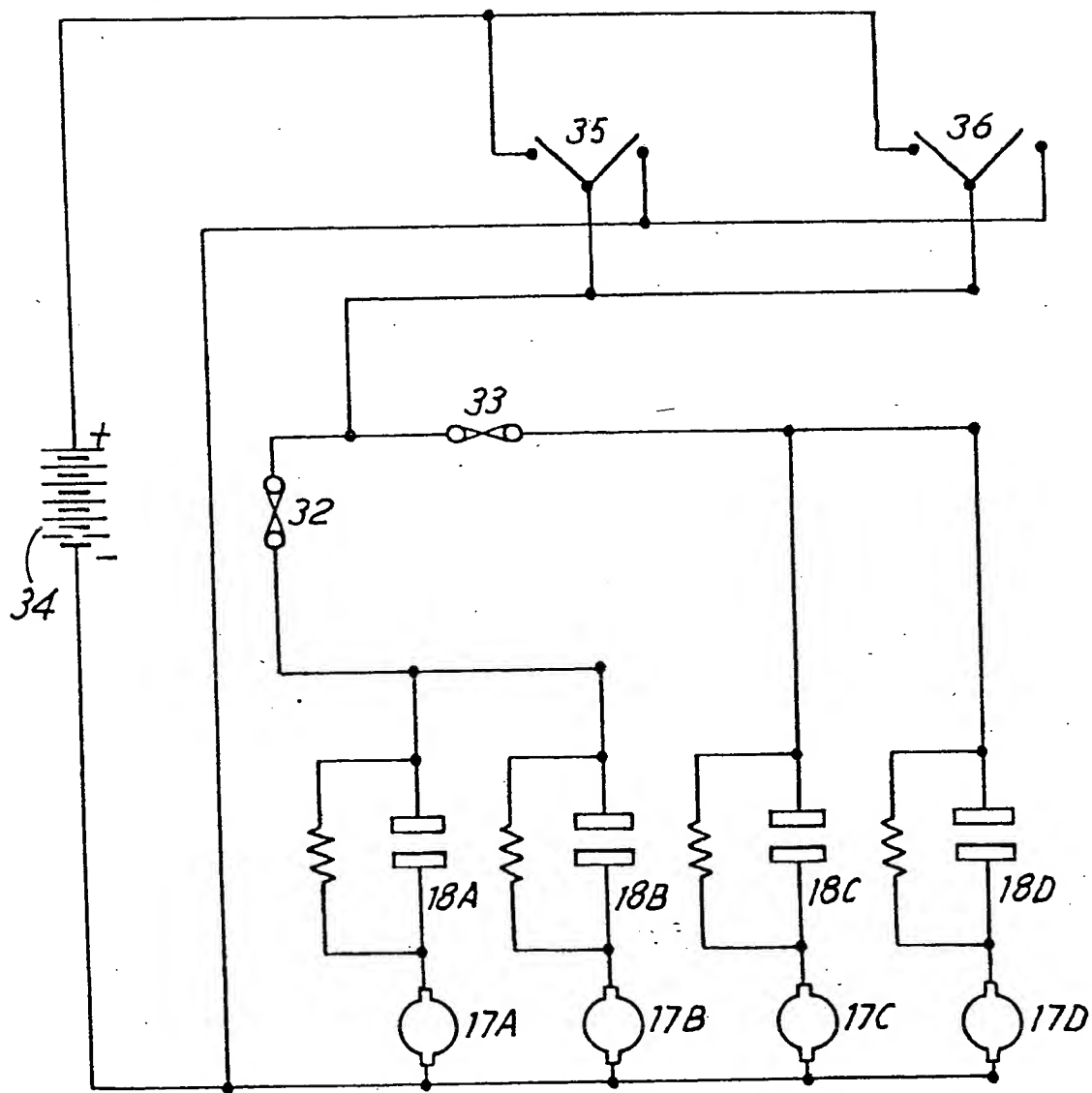


FIG. 6

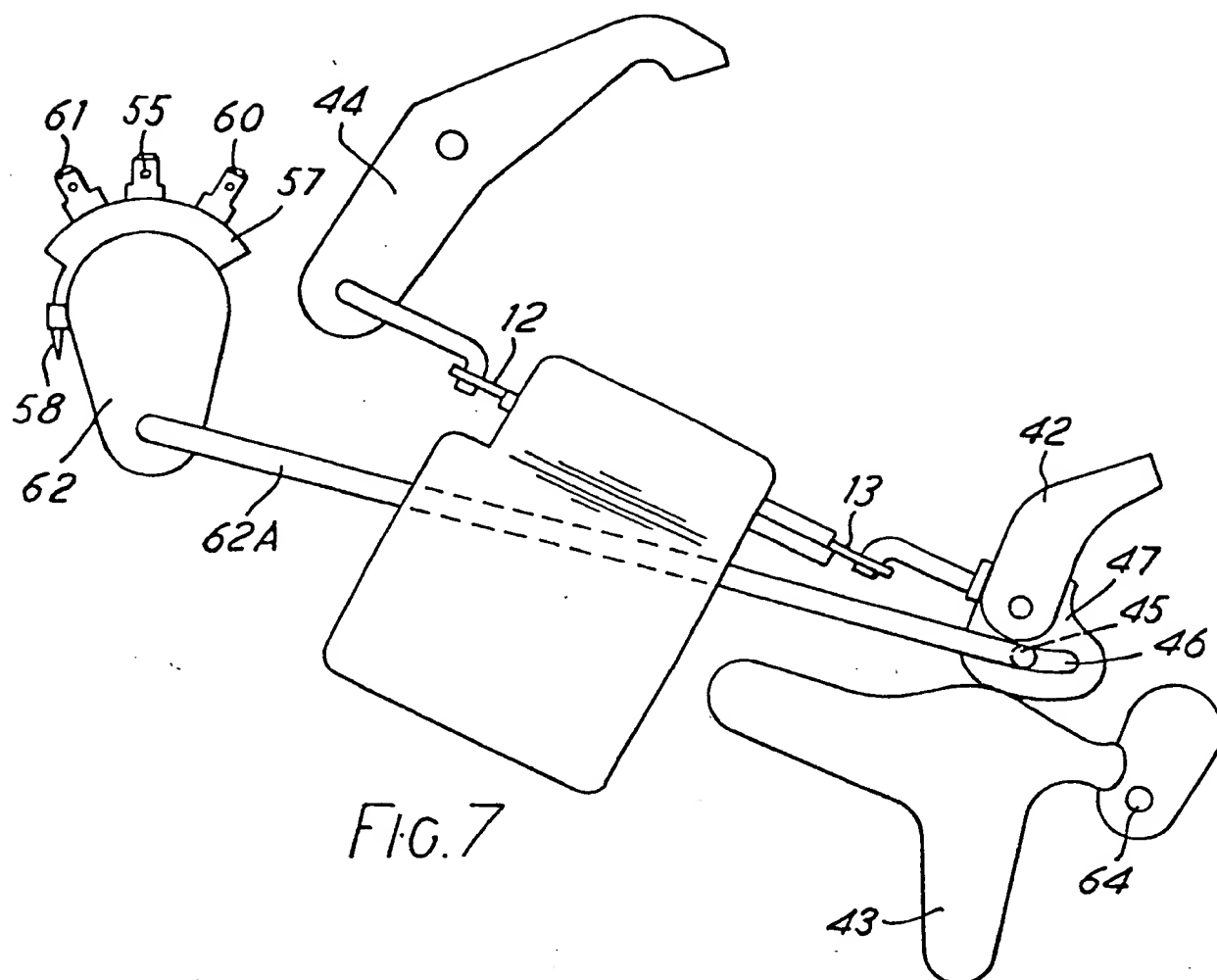


FIG. 7

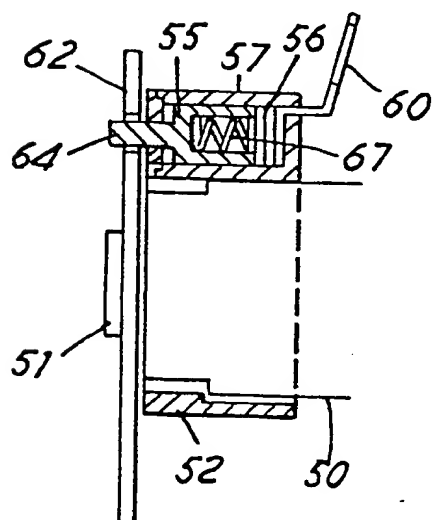


FIG. 8

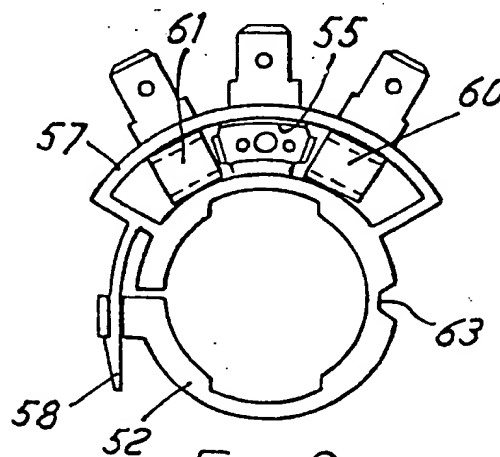


FIG. 9